Development of a "where-to-land" decision function for an expert piloting system (EPS) for piloted and autonomous air vehicles (Phase II)

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Abstract:
High Level Overview
"We can't do it... We're gonna be in the Hudson." Capt. Chesley "Sully" Sullenberger.

These words were spoken just minutes before Flight 1549 ditched into the Hudson River only minutes after takeoff from LaGuardia Airport on January 15th, 2009. The aircraft, an Airbus A320, had struck a flock of Canadian geese disabling both of its engines and rendering the aircraft a glider during initial climb-out. After a quick assessment of the situation and analyzing the options for his crippled aircraft, Capt. Chesley Sullenberger, or "Sully", a veteran pilot of 40 years and 19,000 flying hours, made a decision to attempt a water landing in Hudson. His decisions remarkably saved all 155 passengers on-board his aircraft as well as many other potential victims on the ground.
In general, the commercial airline industry depends on expert pilots like Sully to make critical decisions in complex emergency situations. However, there are many situations which either the pilots are not as experienced as Sully, lack his exceptional situational awareness, or are encumbered by technological limitations (such as in a UAV). In these circumstances, a system that automatically makes the decision as to where to land, ditch, or even crash an air vehicle in order to minimize the amount of damage which occurs to the aircraft and the amount of damage and/or loss that occurs on the ground is needed.
Additionally, current concepts for the wide spread public usage of air vehicles call for a dramatic increase in autonomy in the piloting functions. For this application, we will not be able to depend on an expert pilot in order to perform critical decision like these. Therefore, an automatic decision function that is able to determine where to land in the event of an emergency will be critical and required.
That is why this proposal seeks to continue development of a where-to-land (WTL) decision function as a part of a larger expert piloting system. This function has the potential to save lives in the near term as a manually actuated and controlled decision function and provide a critical safety function in the development of completely autonomous air vehicles that will open up the skies to widespread public utilization.